

## WHO VOTES BY MAIL?

### A DYNAMIC MODEL OF THE INDIVIDUAL- LEVEL CONSEQUENCES OF VOTING-BY-MAIL SYSTEMS

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**Abstract** Election administrators and public officials often consider changes in electoral laws, hoping that these changes will increase voter turnout and make the electorate more reflective of the voting-age population. The most recent of these innovations is voting-by-mail (VBM), a procedure by which ballots are sent to an address for every registered voter. Over the last 2 decades, VBM has spread across the United States, unaccompanied by much empirical evaluation of its impact on either voter turnout or the stratification of the electorate. In this study, we fill this gap in our knowledge by assessing the impact of VBM in one state, Oregon. We carry out this assessment at the individual level, using data over a range of elections. We argue that VBM does increase voter turnout in the long run, primarily by making it easier for current voters to continue to participate, rather than by mobilizing nonvoters into the electorate. These effects, however, are not uniform across all groups in the electorate. Although VBM in Oregon does not exert any influence on the partisan composition of the electorate, VBM increases, rather than diminishes, the resource stratification of the electorate. Contrary to the expectations of many reformers, VBM advantages the resource-rich by keeping them in the electorate, and VBM does little to change the behavior of the resource-poor. In short, VBM increases turnout, but it does so without making the electorate more descriptively representative of the voting-age population.

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Voting is the fundamental act of citizenship in a democracy. However, in the United States, election day actually consists of a series of simultaneous local elections. These are administered by local officials under local rules, at times and places that are locally determined. Throughout the history of suffrage in the United States, there have been a number of reforms designed to expand electoral participation. Some have dealt with the criteria of eligibility, most notably in terms of race and gender. There have also been attempts to increase levels of participation by facilitating both of the steps necessary to cast a vote—getting registered and getting to the polls (Kelley, Ayres, and Bowen 1967; see also Timpone 1998). Some of these attempts have been made at the national level, including passage of the Voting Rights Act of 1967 and the National Voter Registration Act of 1993 (the “motor voter” bill). But, more often, innovations in the way that elections are administered have been left to local jurisdiction and law.

The primary goal of these administrative reforms has been to lower the costs of voting (Downs 1957) both in order to increase levels of participation and to make the participating electorate more reflective of the population as a whole. Recent innovations include opening polling places for longer hours on election day; employing “early voting” that opens polling for several days before an election; and easing qualification for an absentee ballot, including an allowance for registration as a “permanent absentee voter.”

In general, these changes seem to have yielded only modest effects. Assessments of the impact of the National Voter Registration Act of 1993 suggest that registration rolls have increased overall but that the impact on party registration has varied with the type of registration procedures permitted (Knack 1995; Knack and White 1998). Franklin and Grier (1997) find no partisan advantage associated with motor-voter procedures and preferences in the 1992 presidential election. Similarly, analysis of the impact of early voting procedures, based on two exit polls with early voters and election day voters in Texas, suggests that there are no demographic differences in the two populations and that early voting procedures seem unable to produce substantial increases in registration or voting (Stein 1998; Stein and Garcia-Monet 1997).

We focus here on another of these recent innovations—voting-by-mail (VBM). By mailing ballots to the homes of every registered voter up to 3 weeks in advance of election day, election officials give potential voters ample

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time to cast their votes at their convenience. By one estimate, 19 states have used VBM for at least one election (Rosenfield 1994, 1996), but the state with the greatest experience with this form of balloting is Oregon (Mason 1984).<sup>1</sup> Oregon held its first local VBM election in 1981. Since then, local election officials in Oregon have supervised hundreds of VBM elections, both partisan and nonpartisan and those for primaries, special elections, and general elections. The citizens of Oregon adopted by initiative a proposal to conduct all of their elections by mail, and they have been doing so since 1998.<sup>2</sup> In effect, our study stands at a critical juncture in a transition to full adoption of a new voting procedure.

This analysis is based on data collected during the first statewide use of VBM in a partisan election. As a result of the resignation of Senator Robert Packwood in September 1995, Oregon held a special election to replace him. The secretary of state, a strong advocate of VBM elections, decided to organize the election by that method. In December 1995, 36 county election officials organized the first statewide special primary election for a partisan office using VBM, and in January 1996 they held the first statewide special general election for a partisan office.<sup>3</sup>

1. Currently, there are 30 states that allow citizens to mail in ballots, whether in the “weak” form, which allows requesting an absentee ballot, or in the “strong” form, where a ballot is mailed to every registered citizen in the state and that is the only way the citizen can cast a ballot. In 13 of these states, at least some jurisdictions can hold all-mail elections or voters can request to become “permanent absentee voters,” so that a ballot will always be mailed to their homes. For the latest information on balloting procedures in the states, consult the web site of the Council of State Governments at [www.stateneews.org](http://www.stateneews.org).

2. Turnout in any particular election is a function of a number of factors, including the highest office on the ballot and the stimulus of a particular campaign. In the period just preceding the election under study, turnout in the 1992 presidential election in Oregon was 82.4 percent of registered voters. This was a competitive campaign between George Bush and Bill Clinton held at polling places. In 1996, the election was relatively uncontested between Clinton and Bob Dole. Even though registered voters had easy access to absentee ballots and these made up 48 percent of all votes cast, turnout declined to 71.3 percent. The 2000 presidential election was the first held entirely by mail in Oregon. Turnout increased in 2000 to 79.8 percent. Some, but not all, of this 8.5 percentage point increase can be attributed to the switch in voting techniques, but this was a more vital campaign for Oregon citizens. The vote count was slowed in the 2000 election, because of the large number of votes cast and because the number of referenda was so great that the ballot actually appeared on two punch cards per voter for the first time. But there were no significant charges of fraud or corruption, reflecting no change from recent elections in Oregon.

3. To understand and assess the impact of voting-by-mail in Oregon, it is necessary to understand the procedures used there when it held the first statewide elections by mail for a federal office. Oregon should be considered a “mature” VBM system as it is staffed by experienced administrators and populated by voters who understand the procedures well by now. In the special primary election in December 1995, mail ballots were delivered to more than 1.4 million registered partisans in the state, and over 820,000 ballots were returned, for a turnout rate of 57.9 percent. In the special general election, more than 1.8 million ballots were mailed to registered voters in the state, and 1.2 million ballots were returned, for a turnout rate of 66.3 percent. These were special elections only because they were held to fill a vacant U.S. Senate seat. Both primaries were contested, and candidates spent millions of dollars on television advertising. Since both Oregon Senate seats had been held by long-term incumbents, this was the first competitive election in several years. Ballots could be mailed or dropped off any time after they were received. In

These two elections interested election researchers and administrators across the country (Mutch 1992). The researchers and administrators wanted to know whether easing the cost of voting through VBM would increase turnout in Oregon. And they were interested in how and whether the method should be adopted in other jurisdictions.<sup>4</sup> Many researchers and public policy makers see VBM as a step along a path representing a logical, technological progression to electronic voting from home by computer, cable television system, or telephone—all with the goals of increasing turnout, saving money in election administration, and increasing the accuracy of vote tabulation.

Despite interest in the broad applicability of VBM and its potential to make elections more democratic, scholars have paid little attention to the individual-level impacts of VBM. Prior research provides some insight into the net aggregate impact of VBM on turnout (see, e.g., Southwell 2000; Southwell and Burchett 1996) through the analysis of county- and state-level data. But these researchers could not say whether VBM changes the composition of the electorate in the short run. Researchers are equally in the dark about whether VBM will create a durable change in the electorate. To fill this gap in our knowledge, it is necessary to examine how VBM affects individual voting behavior over time. In this way, we may properly assess the impact of VBM on both turnout and the composition of the electorate in Oregon.

In the sections that follow, we begin by discussing a reconceptualization of the American electorate. We then turn to a unique data collection obtained as part of a study of the implementation of VBM in Oregon that included individual vote histories, and we describe a useful methodological approach to its analysis.<sup>5</sup> Finally, we present the results of an analysis that investigates both the mobilization and retention impacts of VBM, and we discuss implications for other jurisdictions contemplating electoral reform.

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this regard, the Oregon system has some attributes that resemble “early voting” in other jurisdictions. Most of the completed ballots were returned by mail to a local election official in double sealed envelopes, the outer one containing a signature that could be verified and the inner one containing the secret ballot. To be counted, ballots had to be received by 8 P.M. on election day; postmarks were not relevant. If the ballot was returned by mail, the voter provided the 32-cent stamp for return postage. Each county also provided at least two locations for dropping off ballots, including the county courthouse; several offered many more. All told, there were 165 drop-off sites for the special general election in the 36 Oregon counties.

4. There have been a number of criticisms directed at VBM procedures, wherever they are used, that raise potentially significant issues about how democratic the procedure is. There have been some studies that suggest that it has not proved to be as economical as some administrators thought it would be (Morrison 1996; Smolk 1996). There is also a concern that VBM may increase the costs of campaigns for candidates even as administrative costs are reduced (Waste and Sparrow 1985).

5. The study was conducted by the Center for Political Studies at the University of Michigan and the Survey Research Center at Oregon State University. The methodological details of the study may be found in Mason and Traugott 1996 (an unpublished manuscript available from Traugott) or in Belli et al. (1999).

### **Assessing the Impact of Election Administration on Outcomes: Moving from the Aggregate to the Individual**

For VBM to be effective, it must create a durable change in the electorate. But, as the current debate about the impact of the motor voter bill makes clear, it is hard to assess whether changes in election administration intended to increase turnout or the representative character of the electorate actually have the desired effect (Highton and Wolfinger 1998). Many of these analyses face the difficulty of using inappropriate data to gauge the impact of changes to electoral laws. Aggregate-level data, such as county- or state-level election returns, fail to capture fully the amount of individual-level shifting that takes place across elections. This limitation poses serious problems for understanding the individual-level impact of VBM, because the dynamic nature of voting behavior is rarely observed empirically.

It is critical to pay attention to such dynamic behavior, because over the long haul people tend to flow in and out of the electorate. The literature on voting and on the consequences of administrative procedures for turnout levels often leaves the impression that the electorate is composed of a core of regular voters that is sometimes joined by a set of marginal voters. Individual-level data demonstrate that this assumption is incorrect (see Burnham 1987; Campbell 1960; Sigelman and Jewell 1986; Sigelman et al. 1985). There are two ways, not one, by which the electorate can grow. The voting pool most obviously grows when voters join the electorate (mobilization), but the population of voters expands even more when existing voters fail to drop out of the electorate (retention).<sup>6</sup> These are two quite different processes, each of which can make an independent contribution to turnout growth. To focus only on the mechanism of mobilization misses a key point. It is necessary to look at the individual-level movements in and out of the electorate that underlie the aggregate changes. These inform us about who moves in and out of the electorate as well as whether these shifts are permanent or temporary. Only in this way can we understand the effect of electoral reforms on the composition of the electorate.

### **Data Sources and Methods**

Our interest, then, is in how VBM changes individual behavior over the long run, given an individual's past movement in and out of the electorate. The

6. This shift over time can be illustrated by an example from population dynamics. Two populations of the same initial size and with the same birth and death rates will be identical 1 decade later. However, if the birth rate of the first population increases, the size of the population will increase relative to the second population. This first condition is akin to increasing the population of voters through an increase in the rate of drawing new voters into the electorate (mobilization). Similarly, if the death rate of the first population decreases, the size of the population will increase relative to the second population. This condition is akin to increasing the size of the voting population by keeping existing voters in the electorate (retention).

most appropriate data for our purposes are panel data that trace the voting behavior of individuals over time. The primary data source for this study is a survey conducted with adult citizens who resided in telephone households in Oregon in February 1996.<sup>7</sup> Interviews were conducted between February 1 and March 12, and a total of 1,483 interviews were completed, for an overall response rate of 60.3 percent.<sup>8</sup>

The focus of the questionnaire was on the special primary and general elections for the U.S. Senate in December 1995 and January 1996. However, this survey did not provide another important piece of information, namely, the over-time voting behavior of the individuals in our sample. Obtaining a relatively complete voting history for each respondent was an important part of the project, but we did not use self-reports of voting because of the consistent observation of overreporting (Traugott and Katosh 1979). We believed this information was more appropriately obtained from a validation effort than by asking questions about past voting behavior (Traugott and Mason 1996). Validators were sent to the election administration offices in each county to obtain information on registration status and voting behavior in previous elections. Additional information was added about the characteristics of each election, such as whether it was conducted at polling places or by mail; the relative occurrence of partisan and nonpartisan races; and whether it was a primary, general, or special election. Together these data gave us the information needed to discern the effects of VBM.

We expect VBM to affect the likelihood of voting by only those people who are registered, because the technique involves delivering a ballot by mail to the home of every registered voter.<sup>9</sup> As a result, the analysis presented here is based only on individuals who were shown as registered in the clerks' offices for the five elections held from May 1994 to January 1996.<sup>10</sup> Not all

7. See n. 5 above for details of this study. In the first stage of the design, each county in the state was assigned to one of four strata. The county was selected as the unit of examination because of the need to validate the survey responses concerning registration and voting status and construct individual voting histories in the county clerks' offices, where such records are maintained. In the next stage, the survey employed a random digit dialing (RDD) design, by which numbers were generated from the working exchanges within each county. These numbers were screened for residences, and an eligible adult was randomly selected within each household.

8. A complete description of the survey methodology can be found in Traugott and Mason (1996).

9. Our model focuses on the long-term voting behavior of citizens already registered to vote. While some administrative reforms are designed to increase registration rolls, that is not a goal of VBM. At the individual level, VBM's purpose is to increase turnout among those already registered. If a person is a voter (if that person has voted in the past), an important effect of VBM is to retain that person in the electorate by mitigating the impact of events—like sickness, travel, or a heavy work schedule—that might reduce the person's likelihood of voting on any particular election day.

10. The elections we used and their significant attributes were (1) May 1994—a statewide primary conducted at polling places, with both referenda and partisan races heading the ballot; (2) November 1994—a statewide general election conducted at polling places, with partisan races heading the ballot; (3) May 1995—a statewide primary conducted by mail, with a referendum; (4) December 1995—a statewide special primary conducted by mail, for the U.S. Senate; and

of the survey respondents were registered to vote, and we obtained data concerning the registration status and voting behavior of 1,081 individuals for at least one election. Data on individual voting behavior for the full set of five elections were available for 846 respondents.<sup>11</sup>

#### INDIVIDUAL-LEVEL VOLATILITY

The data for Oregon demonstrate an over-time turnover in the electorate similar to that observed by previous scholars (see Burnham 1987; Campbell 1960; Sigelman et al. 1985; Sigelman and Jewell 1986). Across our series of five Oregon elections, 25 percent of the registered voters voted in all of the elections, and 10 percent voted in none. The vast majority of voters (65 percent), therefore, moved in and out of the electorate across this sequence. These data underscore the importance of two points. First, the calculation of a difference measure based on a comparison of aggregate state-level turnout rates drastically understates the total amount of change in participation from one election to another at the individual level. Second, and most important for our purposes, these individual-level shifts in voting behavior are the result of two distinct processes that can increase aggregate turnout. Through one, registered non-voters can be brought into the electorate (mobilization); through the other, existing voters can be encouraged to stay in the electorate (retention). While previous research has focused almost exclusively on mobilization, the key to understanding the impact of any administrative reform like VBM is to take account of its impact at the individual level on both the process of mobilization and the process of retention over the long haul.

Examining the dynamic turnover of the electorate is important, because we are interested in VBM's effect on the composition of the electorate, not just its effect on aggregate turnout. The VBM system could have a direct impact on the electorate by mobilizing or retaining Democrats or Republicans. In addition, VBM could have significant indirect effects. By changing the resource endowments of the electorate, VBM could change the partisan composition of the electorate. Increased mobilization might make the resulting electorate more representative of the voting-age population, as some propo-

(5) January 1996—a statewide special general election conducted by mail, for the U.S. Senate. The VBM elections are the last in this sequence, so, in principle, all of the prior voting history precedes them. This permits an appropriate assessment of its impact on habitual behavior.

11. There are several reasons why some cases “went missing.” The largest group consisted of respondents who were not registered for one or more elections in the early part of the series. The analysis was conducted only for respondents who were registered across the entire 2-year period in order to trace their full set of movements across this interval. Analysis indicates that there appears to be no systematic pattern to these missing cases for the period from 1994 to 1996. The data, then, can be considered “missing-at-random” (Little and Rubin 1987); as a result, the missing cases can be ignored for the purposes of likelihood-based inferences without fear that the reduced sample size will bias any inferences. An additional adjustment was made for missing data on the demographic and attitudinal predictor variables in our model, which further reduced the analytical sample size to 811 cases.

nents of VBM suggest. However, increased mobilization or retention of voters in the electorate could also sustain or heighten the economic and social stratification that already exists.<sup>12</sup>

The answer to these questions is especially important. Controversies in other jurisdictions that consider adopting VBM will center on its potential impact on the resource and partisan composition of the electorate. There is a “common knowledge” belief that efforts to ease voting costs will advantage the Democratic Party; that is why the Republican-controlled legislature in Oregon would not report out a bill to permit voting-by-mail. Our ability to extrapolate from the Oregon results to other states to address these concerns depends on our ability to compare the composition of the electorate in other states with that in Oregon.

### Model Development

To evaluate the impact of VBM, then, we need to understand whether and how VBM changes the ordinary pattern of churning of the electorate. We ask explicitly whether VBM keeps voters voting—through the process of retention—and whether it encourages nonvoters to become voters—through the process of mobilization. We must, therefore, turn to a model that moves beyond the aggregate effect of VBM and beyond an individual’s propensity to turn out in a single election. Given our concerns, the most appropriate technique for our purposes is duration analysis, because it allows us to focus on the long-term behavior of individuals over a series of elections (for an excellent introduction to duration analysis, see Box-Steffensmeier and Jones [1997]).<sup>13</sup>

In a duration model, the focus is on how long one remains in one of the two “states”—voting or nonvoting. Our question is whether those durations

12. This possibility became a source of partisan contention in the state, the main reason that citizens were eventually forced to the initiative process to implement VBM for all statewide elections.

13. We prefer this analytical approach over the one that others such as Sigelman et al. (1985) used. A random effects probit model allows for random, persistent differences between people and for general autocorrelation in the error terms of individuals over time (Hsiao 1986, pp. 154–80). The dependent variable in such a model is whether the person voted in the election, and the effects of VBM are captured in a coefficient on a variable measuring whether the election was carried out by VBM. This strategy has its shortcomings. The random effects probit model requires us to assume that voters and nonvoters are made anew at each election—that people come to each election and decide whether they are voters or nonvoters this time. In other words, the random effects probit model requires us to assume that voter mobilization—bringing new voters into the electorate—and voter retention—keeping existing voters in the electorate—are precisely the same processes. Under such a setup, past voting behavior has no impact on present behavior over and above autocorrelation and unmeasured heterogeneity. As a result, there is no meaningful distinction between an individual’s short- and long-term behavior. The random effects probit model does offer an important look at the net impact of VBM. In our estimates, e.g., VBM’s net impact is to increase the average person’s propensity to turn out in a given election by 6 percent, which is the equivalent, on average, of a six-percentage-point increase in turnout. This is a small, but clearly noticeable, effect in the desired direction. (The full set of results from this estimation is available from the authors on request.) However, this model is clearly inappropriate for our purposes.



are longer under VBM than they would otherwise be. The dependent variable is the length of time that elapses from the beginning of some event (e.g., entering the electorate) until its end (e.g., dropping out of the electorate). Because we are interested in distinguishing between voter mobilization and voter retention, we examine the length of two types of spells: the duration of voting and the duration of not voting. This formulation is, admittedly, a nontraditional way to examine individual voting behavior. But such a formulation is necessary to distinguish between the two ways the electorate could grow as a consequence of VBM.

Our dependent variable, therefore, is a respondent's duration in a particular state—the state of voting or the state of not voting. We are most interested in determining the effect of VBM on individuals' tendencies to leave their current state. Thus, we focus on the rates at which people move between states by modeling the hazard function.<sup>14</sup> In fact, we model two hazard functions to capture the two different processes that create changes in turnout—mobilization and retention.

A hazard function may be modeled as a function of both time and independent variables. We address the issue of time by modeling our belief about the way the hazard rate changes over the duration of the state. The question is whether a respondent's likelihood of not voting changes the longer she has been persistently voting, or the likelihood of voting the longer she has not been voting. This rate is almost certainly not constant. We allow the hazard rate to stay the same, increase, or decrease over the course of the duration in the state and to take on different values for the two different states. Specifically we model a duration dependence parameter for each hazard function.<sup>15</sup>

14. These hazard functions are part of a model of duration with three conceptual components—an instantaneous rate of leaving a state (the hazard function), a probability of surviving in a state past a certain point (the survivor function), and a duration in a state. We could conceptualize our dependent variable in any one of these three ways. Because of our interest in mobilization and retention, we will develop a model of the transition rates between the two states—the hazard function. While these three conceptual components convey somewhat different information about the duration model, they are simply three ways of looking at exactly the same question. Any one of the three components could be derived from the other two, using relatively simple calculus. Each component highlights a different aspect of data on durations. In this article, we will ask whether VBM changes individual behavior, using a particular form of duration analysis—a continuous-time, multistate duration model.

15. We model the rate as a Weibull function, which allows for fairly controlled movement of the hazard rate over the duration in the state. We were concerned that our results might be specification dependent, so we estimated the model with two other functional forms—as an exponential and as a Gompertz. The exponential form does not allow duration dependence. The Gompertz allows duration dependence, but the increase or decrease in the hazard rate is relatively constant over the time in the state; this contrasts starkly with the Weibull form, in which the increase or decrease is initially substantial but then tails off the longer the person is in the state. Neither of these quite different alternative specifications offered substantively different conclusions about the effects of VBM. In fact, the results presented below are extremely robust to changes in the functional form of the hazard rate. The Weibull form is more consistent with the behavior we are modeling, and likelihood ratio tests suggested that it fit the data better. In combination with the heterogeneity components we describe below, the Weibull model provided the most information about the processes of mobilization and retention.

Of course, voting is not simply a function of the duration in the state. We are more interested in how individuals react to a change in the institutional voting environment. Thus, we coded variables measuring whether a given election is (1) a partisan or a nonpartisan election, (2) a primary or general election, and (3) conducted under a VBM system or at polling places. Second, to determine how differences in individual resources affect citizens' voting behavior, we use a fairly straightforward model of turnout, with measures of the respondent's age, length of residence, partisanship, campaign interest, and education.<sup>16</sup> Respondents who are older, have lived in the same place for longer, are partisans, are highly interested, and are well educated should all turn out at higher rates (Wolfinger and Rosenstone 1980).<sup>17</sup> Finally, because we are interested in the effect of VBM on the composition of the electorate, we include interaction terms between VBM and the demographic and attitudinal variables in our model.<sup>18</sup> Such a setup allows for the possibility that VBM works differently for different groups of respondents.

As noted above, we estimate two hazard functions—one for the transition from nonvoting to voting and one for the transition from voting to nonvoting. We allow all of our variables to have different effects on respondents depending on whether the respondents were previously voters or nonvoters. This modeling strategy is important because, as noted above, the political impact of VBM cannot be measured simply through its effect on mobilizing new voters into politics. To explore the political effects of VBM fully, we must determine whether these new voters resemble the existing voters and gauge VBM's ability to sustain the political activity of existing voters.<sup>19</sup>

16. In our early cross-sectional analysis, we included several other variables in the model, including the respondent's gender, whether the respondent had children, and the respondent's income. None of these other variables had a systematic impact on the propensity to vote, and so we restrict our model here to a more limited set of variables. In the models estimated below, we treat all variables as continuous variables. At the suggestion of a reviewer, we substituted a series of categorical dummy variables for the education and political interest variables. The results were almost exactly the same as those of the original specification. First, variables that were significant in our original specification had a linear relationship with the dependent variable. In addition, none of variables that failed to reach significance in the original specification showed evidence of nonlinear effects in the dummy variable model. These results indicate that treating these variables as continuous is a reasonable strategy. We also divide length of residence and age by 100 to aid the estimation procedure. Rescaling these variables in this way in no way changes the results presented below.

17. While the validation component of our data collection permitted the construction of vote histories, the cross-sectional survey only measured the predictors at a single point in time. Of course, these variables could take on different values at different points in time.

18. We did not include interactions between VBM and type of election because the introduction of these terms uniquely identifies the five elections in our series. As Oregon conducts more elections by VBM, we will be able to gather additional data to see if VBM works differently in different types of elections.

19. While the model presented to this point is fairly comprehensive, it is incomplete in one important aspect. Our modeling strategy must also account for heterogeneity—the systematic ways that individual behavior may vary that are not captured by the coefficients in our model. The “average behavior” our models describe may be a quite inadequate picture of individual behavior, and we will need to devise some way to capture this heterogeneity to ensure that our

To account for all of these factors, we use the general duration model with heterogeneity proposed by Flinn and Heckman (1982,1983). The econometric specification of the model is presented in the appendix. The Flinn and Heckman model coefficients allow us to measure the effects of election conditions and individual characteristics on transitions from one state—voting or not voting—to the other. When these coefficients are positive, they indicate that increasing the value of the variable increases the hazard rate (the likelihood that individuals will leave their current state). So the larger the positive number, the greater is the extent to which a given variable increases the likelihood of transitioning out of a given state. When these coefficients are negative, they indicate that the variable decreases the hazard rate and encourages individuals to remain in the state. Thus, the more negative the estimate, the greater the extent to which a given variable decreases the likelihood of transitioning out of a given state.<sup>20</sup>

## Results

Does VBM increase turnout in Oregon? Does it change the composition of the electorate; that is, does it work its magic on some voters and not others? Our short answer to these critical questions is “yes.”

The results presented in table 1 provide information on just how VBM affects that portion of the population that consists of neither persistent voters nor nonvoters, that is, the portion of the population who show variability over the series.<sup>21</sup> The estimates of gamma—the parameter that indicates whether

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coefficient estimates are unbiased. This is crucial; without modeling the heterogeneity, we have little hope of sorting out the impact of VBM on the individuals in our data. As Heckman and Walker (1990, p. 240) note, “these issues are of paramount interest when we wish to use fitted models to evaluate policy interventions which change included variables but not omitted variables. Fitted empirical models may shed little light on the likely effect of such interventions.” There were several ways that we could model the heterogeneity in our data depending on how we believe the sample distributes around the “average” respondent. This distribution could be U-shaped, as in the Heckman and Willis (1977) example. Few of the respondents there resembled the “average”; most were at the end-points of the distribution. This distribution could, however, take other shapes as well. It could, for example, be J-shaped (with many of the respondents in one tail, some respondents in the other, and a few in-between at the average), uniform (without any concentration at any point), or normal (with the mass concentrated on the average). In our model, we rely on a model of “state-specific heterogeneity”—heterogeneity that is somewhat U-shaped. This model is more supported by our data than are other models of heterogeneity. Of course, “never” and “always” are relative terms here. We know that some respondents did not vote in any of the elections we examine, and we know that some respondents voted in all of them. Unfortunately, we do not know more than that about their persistence.

20. Put another way, the closer the coefficient estimate is to zero, the less difference the variable makes.

21. The first question to consider is the role that heterogeneity plays in these data. As table 1 demonstrates, there are some persistent nonvoters and persistent voters immune to the effects of VBM. The proportion who are completely persistent in a state is  $\exp(\Phi)/[1 + \exp(\Phi)]$ , where  $\Phi$  is the estimate of heterogeneity among the voters or among the nonvoters. This is the U-shaped state-specific heterogeneity we discussed earlier. The coefficients on the heterogeneity terms suggest that 8 percent of the respondents are persistent nonvoters and that just over 15 percent

**Table 1.** Does Voting-by-Mail Increase Turnout at Different Rates for Different Groups (Duration Model with Hazard Function)?

Variable	Transition: Nonvoting to Voting	SE	Transition: Voting to Nonvoting	SE
Voting-by-mail (VBM)	-7.19**	(.77)	-3.08**	(.75)
General election	-4.17**	(.29)	-.52	(.38)
Partisan election	-4.41**	(.37)	-2.99**	(.49)
Education	.37	(.51)	-.83**	(.22)
Age	.53	(1.19)	-5.19**	(.45)
Campaign interest	.06	(.44)	-.28	(.18)
Length of residence	-.03	(1.31)	-.06	(.53)
Registered Democrat	-.01	(.44)	.05	(.16)
Registered Republican	.02	(.43)	-.20	(.18)
VBM x age	2.57*	(1.47)	-.41	(1.03)
VBM x length of residence	-.34	(1.63)	-2.19*	(1.13)
VBM x registered Democrat	.05	(.55)	-.97**	(.36)
VBM x registered Republican	.20	(.53)	-1.01**	(.38)
VBM x campaign interest	.97*	(.53)	-.44	(.41)
VBM x education	1.10*	(.62)	.14	(.49)
Intercept	25.90**	(1.04)	21.35**	(1.08)
Gamma (duration dependence)	3.35**	(.10)	2.34**	(.18)
<i>N</i>			811	
Log-likelihood			-3,578	
Heterogeneity, nonvoting (SE)		-2.44**	(.15)	
Heterogeneity, voting (SE)		-1.73**	(.22)	

\*  $p < .10$ .\*\*  $p < .05$ .

the hazard rate changes over the time a respondent spends in a state—indicate the existence of positive duration dependence. In other words, the longer a respondent is in the state, the more likely she is to leave it. However, there is significantly higher duration dependence for nonvoting than for voting. Of

of the respondents are persistent voters. Thus, we are left with some three-quarters of our sample that can be affected by this policy change.

those who spend a long time in either state, nonvoters are more likely to leave their state than are voters. Thus, over time, having accounted for those citizens who never change their voting patterns, the net impact of these unmeasured factors is to mobilize rather than to demobilize individuals into the electorate.

The coefficients for election type (general elections relative to primary or special elections and partisan elections relative to nonpartisan elections) are negative in both transitions. Thus, neither general elections nor partisan elections encourage a respondent to change her voting behavior over the long run. In fact, the opposite is true. Both partisan elections and general elections encourage stability in the electorate by keeping individuals in their previous state of voting or not voting. High-stimulus elections do not mobilize more new voters (relative to nonpartisan and primary elections), but they do encourage the retention of existing voters.

While these results are all informative in their own right, we are most interested in the effects of VBM. The answer to the question of whether VBM changes behavior in the long run hinges on how people initially respond to VBM. The coefficient on VBM in the first transition, from not voting to voting, is negative ( $\beta = -7.19$ ). Nonvoters who do not respond initially to VBM—those voters who remain nonvoters under VBM—are likely to remain nonvoters for a longer time than they would have without VBM. If the lowered tangible costs of VBM do not pull a nonvoter into the election, little else has a chance of succeeding. This is true for nonvoters who resist the pull of general and partisan elections as well. Put another way, some registered voters are extremely difficult to bring to the polls. Our estimates tell us that these individuals do not respond to either the higher stimulus of general elections or the greater convenience of VBM elections.

Even though VBM is not very effective at pulling resistant nonvoters into the electorate, it does a good job of retaining existing voters, as is demonstrated by the large negative coefficient on the VBM variable in the second transition ( $\beta = -3.08$ ). The VBM system, therefore, decreases the rate at which voters move out of the electorate. We can use the coefficients in the hazard function to calculate the expected duration in a particular state.<sup>22</sup> Without VBM, we predict that voters stay in the electorate only a short time (less than one election, on average); with VBM, voters stay in the electorate over our entire series of elections. Thus, VBM increases turnout over the long run, but it does that more by retaining existing voters than by mobilizing new voters.

22. The hazard rate is simply  $\exp(\gamma \ln(t) + x\beta)$ , and the expected duration is 1 over the hazard rate. It should be noted that the baseline coefficient on VBM is larger in the first transition than in the second transition. This would seem to imply that VBM has a greater effect on retaining nonvoters than it does on retaining voters. However, once interactions are accounted for, the net effect of VBM is to increase turnout.

In other words, VBM increases turnout by stemming the natural flow of individuals from the state of voting to the state of not voting.<sup>23</sup>

We clearly see these results in our data in the descriptive statistics on behavior over time. Some 47 percent of our sample initially resisted the pull of VBM and abstained in the first VBM election. The resisters were evenly divided among habitual nonvoters, habitual voters, and in-and-out voters. Of the habitual nonvoters who resisted, most (83 percent) abstained at least once in the remaining two elections; well over one-half never voted again. Only 17 total habitual nonvoters in the sample responded to VBM; almost all of these respondents changed their behavior over the long haul and voted in the remaining elections. Of the habitual voters who responded to VBM (some 29 percent of our sample), almost all stayed in the electorate for the rest of the series. While the net effect of VBM is to increase turnout by 6 percentage points, that net effect masks completely the processes of mobilization and retention that generated the aggregate increase in turnout.<sup>24</sup>

These concerns, while important, are only the first step in our analysis. After all, we are as interested in how VBM changes the electorate as we are in whether it increases the size of the electorate. To answer that question, we need to consider how VBM interacts with the personal characteristics of those individuals who make up the pool of eligible voters. The coefficients on the interactive variables in table 1 provide the relevant information.

We first consider the coefficient estimates for the interaction terms in the transition from nonvoting to voting—the “mobilizing” portion of the model. As table 1 shows, VBM’s retaining effects work less well for older abstainers, those who are well educated, and those with higher levels of campaign interest. Older abstainers who are well educated and politically interested may move back into the electorate, even if they abstain initially under VBM. Other abstainers are not so fortunate. As table 1 shows, VBM mobilizes older voters, those who are well educated, and those with substantial amounts of campaign interest. In short, VBM accentuates resource stratifications that already exist in the electorate.

Although VBM may accentuate existing socioeconomic stratifications, it does not differentially mobilize Democrats and Republicans, either directly or indirectly. As the results in table 1 show, neither coefficient on the Democrat and Republican interaction terms is statistically different from zero. The VBM system, then, has no direct effect on the partisan composition of the electorate. Furthermore, there is no indirect partisan effect. As the results in table 2 show, Democrats and Republicans in Oregon are similar in terms of length of residence, age, campaign interest, and education. Of these factors, only education

23. The general pattern of the effects of the VBM variable is the same if a base model without the interactive terms is estimated. We present the interactive model here because the interactive results are more informative.

24. See n. 13 for a more complete description of the analysis of the net impact of VBM.

**Table 2.** Possible Indirect Partisan Effects of Voting by Mail: Are the Means of the Variables through which Voting by Mail Works Different for Registered Republicans than for Registered Democrats?

	For Democrats		For Republicans	
	Mean	SE Mean	Mean	SE Mean
Residence at location (years)	12.39	(.01)	13.08	(.01)
Education <sup>a</sup>	.63	(.02)	.69	(.02)
Age (years)	51.58	(.01)	52.09	(.01)
Campaign interest	1.35	(.04)	1.41	(.04)

<sup>a</sup> Differences between Democrats and Republicans are significant at the .05 level.

differs at the .05 level (and even there the gap between the two groups is substantively small).

Turning to the “retention” part of the model, we find that, unlike the mobilization model, there are no interactive effects between age, campaign interest, or education, and VBM. Instead, the main interactive effects of VBM in the voting-to-not-voting transition work through partisanship and length of residence. The VBM system, then, not only works directly to keep voters voting but also works through partisanship to ensure that partisans—Democrats and Republicans alike (and equally)—keep voting.<sup>25</sup> It also encourages long-term residents who vote to keep voting.

In summary, VBM stabilizes the electorate in a way that increases turnout over the long run. It does this not so much by mobilizing new voters into the electorate, but rather by retaining political participants over a series of elections. To the extent that VBM mobilizes new people into the electorate, all of the action is in the first election; once someone has resisted VBM, there is little chance that that person will move into the electorate under a VBM system. Moreover, the mobilization process works more effectively for the resource-rich than for the resource-poor. The resource-poor who move into the electorate under VBM are much less likely to stay than are the resource-rich. Thus, the effects of VBM are stratified by education, interest, age, and length of residence but not by partisanship, either directly or indirectly. In

25. This finding concerning partisanship is consistent with previous research. Major voting studies, going back to the Columbia series, have shown that those with the strongest commitments—including strong partisans—have voted in the greatest numbers and tend to make up their minds about candidates soonest. Other analyses of the Oregon experience with voting-by-mail suggest that the strongest partisans cast their votes first (Traugott and Mason 1996). So it would appear that the real beneficiaries of VBM may be those individuals who make up their mind well in advance of election day, namely, strong partisans.

the end, the voters who move in and stay in the electorate look much like the existing voters in the system. By reducing many of the direct costs of electoral participation, VBM allows the habitual behavior of voters and non-voters to take center stage. Those we would expect to vote—the resource-rich—are more likely to sustain their vote over the long haul. And those we would expect to abstain—the resource-poor—are more likely to stay out of the electorate over the long haul.

### Extensions

One extension of the model employed here would be its use to evaluate the impact of other electoral reforms on the size and composition of the participating electorate. For example, “early voting” is another version of providing registered voters with extended access to their ballots. With available vote histories and appropriate survey data, this duration model could be used to see the relative degree to which early voting produces increased turnout through retention of habitual voters or the mobilization of habitual nonvoters. And these estimated effects could be compared with those produced by VBM in this analysis to evaluate their relative effectiveness.

The model presented here also provides an explicit basis for estimating the impact of VBM in other jurisdictions. If similar data could be obtained on voting histories, as well as on length of residency, age, education, and registered partisan status, then the parameters presented here would provide a good starting point for estimating the impact of VBM on overall turnout and on the composition of the electorate in other jurisdictions where it has been adopted or in others where adoption is being considered. These data might be available at reasonable cost for ecological units through census and election data. In addition, other variables, such as political interest, could be obtained at greater cost through survey data.<sup>26</sup> To make a first approximation of the impact on mobilization and retention, one could simply use the coefficient estimates we present here and the means of the relevant variables.

Such data could also be used to estimate whether or not there would be any partisan bias in VBM’s effects across different jurisdictions. To assess the size and direction of potential bias, one would want data on the relationships between the individual-level characteristics through which VBM works and the distribution of partisanship in that jurisdiction. To the extent that there is a relationship between partisanship and length of residence, age, campaign interest, and education, we would expect VBM to retain and mobilize Dem-

26. Survey data would also provide a measure of party identification that would be useful in jurisdictions where there is no registration by party. Analysis of the Oregon data substituting party identification for party registration produces the same result. There is no differential mobilization or retention effects for Republican and Democrats, although the relationship is weaker for party identification than registration by party.



ocrats and Republicans at different rates. In such a case, researchers would need more than the means of the relevant variables; they would require individual-level data on registered voters to calculate the relationships between length of residence, age, campaign interest, education, and partisanship.

The potential partisan impact of adopting VBM can vary substantially across jurisdictions. For example, the relationships between the individual-level demographic variables and partisanship look the same in Colorado as they do in Oregon, which suggests that VBM would not change the partisan composition of the electorate were it implemented in Colorado.<sup>27</sup> This is not true in Illinois, where registered Democrats are somewhat more interested in politics than are registered Republicans (and where there is no relationship between partisanship and the other variables through which VBM works). We would expect the implementation of VBM there to mobilize more Democrats than Republicans into the electorate. In New York, VBM probably would encourage more Republicans than Democrats to stay in the electorate, because registered Republicans have lived in the state, on average, 13 years longer than have registered Democrats. In Florida, the relationships cut both ways. Registered Democrats there are older and have lived in the state longer than have registered Republicans, but Republicans there have higher levels of education.

## Conclusions

In this article, we move beyond the existing literature to offer new evidence on the impact of VBM on turnout and the composition of the electorate. Our advances have come from three sources: our conceptualization of the problem as one that must be embedded in individual voting histories, our individual-level panel data across several elections, and our use of a multistate duration model that accounts for the substantial heterogeneity in these data. The payoffs to this approach have been significant. We have shown that VBM increases voter turnout by a small amount in general but that it accomplishes that feat through selective retention of voters. These results suggest that concerns about disproportionate partisan mobilization may be overstated; we found no direct impact of VBM on the relative mobilization or retention of Democrats or Republicans. Instead, contrary to the expectations of many reformers, VBM in Oregon accentuated the stratification of the electorate. Specifically, VBM mobilized those already predisposed to vote—those individuals who are long-term residents and who are registered partisans—to turn out at higher rates than before. This process likely occurs because voting across a 20-day period reduces the impact of idiosyncratic factors that inhibit a habitual voter from going to a polling place on a particular day. The policy change had little positive impact on those without politically relevant resources, such as highly

27. We calculated these relationships using the state-level data from the Senate National Election Study, 1988–92.

mobile registered voters or those with low levels of education or campaign interest. To the extent that VBM changed the Oregon electorate, it enabled those who were resource-rich to remain in the electorate. This result is consistent with recent research on the impact of internet voting, where the same consequence has been demonstrated (Alvarez and Nagler 2000). This non-partisan change could, in theory, have significant partisan consequences in some other jurisdictions if the newly mobilized or retained resource-rich voters are of a particular partisan stripe. In Oregon, however, there is no evidence of such an indirect partisan bias.

In summary, we have advanced a general model for assessing the impact of policy innovations on individual behavior. The crucial advances here are that we embed our estimation of the effects of VBM in individuals' histories of turnout behavior, we specify the two processes of mobilization and retention that create changes in aggregate turnout, and we employ a methodology that permits estimation of the durable effects of such a shift in election administration. These advances provide us with rich comparative data that offer important insight into the effects of VBM on the composition of the electorate. Such an approach allows us to move beyond the question of aggregate voter turnout to more specific analyses that give us purchase on the political impact of VBM. In making this move, we have taken a critical step toward estimating whether VBM increases turnout and—more importantly—understanding the ultimate political effects of that policy change.

## Appendix

### Heckman Model

The Heckman model is given by

$$h_{ij}[t_{ij}|(x(u))_0^\infty, \Theta] = \exp[\gamma_{ij0} + Z(t_{ij} + \tau)\beta_{ij} + c_{ij}\Theta],$$

where

- $t_{ij}$  = duration in state  $i$  before exiting to state  $j$ ;
- $\tau$  = calendar date of entry into state  $i$  (the process is assumed to begin at calendar zero,  $\tau = 0$ );
- $x$  = vector of exogenous and predetermined variables;
- $z$  = functions of the time-varying variables in  $x$ ;
- $\theta$  = person-specific unobserved heterogeneity component; and
- $\gamma_{ij}, \beta_{ij}, c_{ij}$  = transition-specific parameters.

All of the parameters we estimate here are of interest; each helps us understand the processes that encourage people to leave their present state—either voting or not voting. First, the gamma parameter allows us to measure the effect of time in our model. It

is essentially a coefficient on the natural log of the duration in the state. If gamma is positive, there is positive duration dependence—the longer the respondent is in the state, the higher the hazard rate (the rate of leaving the state), and the more likely she is to leave. If gamma is negative, negative duration dependence exists—the longer she is in the state, the lower the hazard rate, and the less likely she is to leave. Second, the coefficients on the independent variables in the hazard function describe the way that the risk of leaving the state changes with the particular explanatory variables, conditional on the fact that a person is either a nonvoter or a voter.

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